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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,789	03/26/2004	Wei Gao	SLA0837	5215

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EXAMINER	
ARANCIBIA, MAUREEN GRAMAGLIA	
ART UNIT	**PAPER NUMBER**
1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/813,789	GAO ET AL.	
	Examiner	Art Unit	
	Maureen G. Arancibia	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-11, 13, 17, 20, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,781,762 to Ozawa.**

In regards to Claims 1 and 21, Ozawa teaches a method of forming a microlens structure comprising: providing a transparent material 210a; forming a hard mask 220' overlying the transparent material; patterning an opening in the hard mask (Column 15, Lines 10-13); and forming a lens shape 500 by etching the hard mask 220' and the transparent material 210a using an isotropic wet etch that etches the hard mask faster than the transparent material (Column 15, Lines 3-6 and 13-14), whereby the hard mask is etched laterally to expose a larger area of the underlying transparent layer as the etch proceeds (Column 15, Lines 14-24). (Figures 12a-12f; Column 14, Line 46 - Column 15, Line 65) The hard mask is 220' is *partially* removed by this lateral etching process, *as broadly recited in the claims.*

In regards to Claim 2, Ozawa further teaches filling the lens shape with a lens material 230. (Figure 12f; Column 15, Line 66 - Column 16, Line 6)

In regards to Claim 3, the transparent material 210a can be silicon oxide. (*quartz*; Column 14, Lines 46-47)

In regards to Claim 4, the transparent material can also be an optical resin. (Column 3, Lines 40-41)

In regards to Claim 5, the isotropic wet etch can be an HF etch. (Column 15, Lines 4-5)

In regards to Claim 6, the lens material 230 has a higher refractive index than the transparent material 210a. (Column 16, Lines 6-10)

In regards to Claim 7, Ozawa teaches that the lens material 230 can be an optical resin (thermosetting transparent adhesive; Column 15, Line 66 - Column 16, Line 1), as broadly recited in the claim.

In regards to Claims 8-10, Ozawa teaches forming an AR coating 200 of quartz glass overlying the lens material, as broadly recited in the claim. (*cover glass 200*; Figure 12f; Column 16, Lines 1-3)

In regards to Claims 11 and 13, Ozawa teaches planarizing the lens material 230 by reflowing the lens material, as broadly recited in the claim. (the lens material is planarized when it is pressed by cover glass 200; Figure 12f; Paragraph 25)

In regards to Claim 17, the opening 220a in the hard mask 220' has non-vertical side walls (Figure 12c).

In regards to Claim 20, the transparent layer can be provided overlying a substrate 10 having a photodetector 9a formed thereon. (Figure 11; Column 13, Lines 59-63)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of U.S. Patent 6,211,916 to Hawkins et al.

The teachings of Ozawa were discussed above.

In regards to Claim 12, Ozawa does not expressly teach that planarizing the lens material comprises chemical mechanical polishing.

Hawkins et al. teaches that planarizing a lens material 130 comprises chemical mechanical polishing. (Column 5, Lines 25-26)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Ozawa to have planarizing the lens material comprise chemical mechanical polishing, as taught by Hawkins et al. The motivation for doing so, as taught by Hawkins et al. (Column 5, Lines 25-26), would have been to planarize the lens material optically flat.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of U.S. Patent 6,307, 243 to Rhodes and U.S. Patent Application Publication 2004/0082094 to Yamamoto.

The teachings of Ozawa were discussed above. Ozawa further teaches that the hard mask 220' can be silicon oxide formed by CVD (Column 14, Lines 50-52) and the transparent material 210a can be silicon oxide. (Column 14, Lines 46-47)

Ozawa does not expressly teach that the silicon oxide hard mask, formed by CVD, can be TEOS oxide.

Rhodes teaches that a silicon oxide layer 72 formed by CVD can be TEOS oxide (TEOS is used as the silicon source; Column 6, Lines 6-18)

It would have been obvious to one of ordinary skill in the art to modify the teachings of Ozawa to have the silicon oxide hard mask be TEOS oxide. The motivation for making such a modification, as taught by Rhodes (Column 6, Lines 6-18), would have been that using TEOS as the silicon source in a CVD process to form a silicon oxide layer results in improved conformal deposition.

Ozawa also does not expressly teach that the transparent material can be thermal oxide.

Yamamoto teaches that a transparent material 305 located below microlenses 313 can be thermal oxide. (Paragraph 23)

It would have been obvious to one of ordinary skill in the art to modify the teachings of Ozawa to form the transparent material of thermal oxide, as taught by Yamamoto. The motivation for doing so would have been to form the oxide by a blanket deposition. Moreover, it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Hawkins et al. as applied to Claim 12 above, and further in view of U.S. Patent Application Publication 2003/0157211 to Tsunetomo et al.

The teachings of Ozawa and Hawkins et al. were discussed above. Ozawa further teaches that the transparent material 210a is undoped silicon oxide (*quartz*; Column 14, Lines 46-47)

In regards to Claim 16, the combination of Ozawa and Hawkins et al. does not expressly teach that the hard mask 220' is a doped silicon oxide.

Tsunetomo et al. teaches a hard mask 28 of a doped silicon oxide (*a predetermined amount of F is added into a SiO_2 layer to form a fluoridated SiO_2 layer 28*) is formed on a transparent layer 26 of undoped silicon oxide. (Paragraph 71)

It would have been obvious to one of ordinary skill in the art to modify the teachings of Ozawa and Hawkins et al. to form the hard mask of a doped silicon oxide, as taught by Tsunetomo et al. (Paragraphs 71-74), would have been that the etching rate of the doped silicon oxide relative to the undoped silicon oxide can be set so as to attain concave etched portions having a desired shape.

7. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of U.S. Patent Application Publication 2003/0157211 to Tsunetomo et al.

The teachings of Ozawa were discussed above. Ozawa further teaches that the transparent material 210a is undoped silicon oxide (*quartz*; Column 14, Lines 46-47)

In regards to Claims 18 and 19, Ozawa does not expressly teach that the method further comprises providing a second transparent material overlying the transparent material and below the hard mask, and having a faster etch rate than the transparent material.

Tsunetomo et al. teaches that a transparent layer 20 to be etched can comprise a plurality of layers of transparent material, each formed of silicon oxide doped with a different amount of fluorine, such that each layer has a faster etch rate than the layer below it (Figure 6). (Paragraphs 29, 61, 62)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Ozawa to form the transparent material to be etched of a plurality of layers of transparent material (thus comprising at least a second transparent material), each layer formed of silicon oxide doped with a different amount of fluorine, such that each layer has a faster etch rate than the layer below it, as taught by Tsunetomo et al. The motivation for doing so, as taught by Tsunetomo et al. (Paragraphs 49 and 64), would have been to produce a lens array each having an aspherical shape.

Response to Arguments

8. Applicant's arguments filed 2 January 2007 have been fully considered but they are not persuasive.

Specifically, in regards to Applicant's argument that layer 220' of Ozawa does not constitute a hard mask as broadly recited in the claim, the Examiner must disagree. Layer 220' performs the function of a hard mask as would be understood by one of ordinary skill in the art, in that it is a hard layer that is patterned and used as a mask for

etching. Just because Ozawa does not term layer 220' as a "hard mask," does not obviate the fact that layer 220' acts as a hard mask *as broadly recited in the claims.*

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., that Ozawa does not teach that all of the hard mask layer 220' is removed after the wet etching step) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that it is unclear that a CMP process as taught by Hawkins could be incorporated in the method and structure taught by Ozawa, and that it is unclear that it would be possible to modify Ozawa to perform shaped etching as taught by Tsunetomo, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in

the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as discussed above, one of ordinary skill in the art at the time of the invention would have found it obvious, with a reasonable expectation of success, to modify the planarizing method taught by Ozawa to comprise a CMP step, as taught by Hawkins et al. (Column 5, Lines 25-26), in order to gain the benefit taught by Hawkins et al. of planarizing the lens material optically flat.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to Applicant's argument against the rejection of Claims 18 and 19 under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Tsunetomo, the Examiner maintains that Ozawa does not expressly teach that the method further comprises providing a second transparent material overlying the transparent material 210a and below the hard mask 220', and having a faster etch rate than the transparent material.

Conclusion

9. Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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